Assessment of Epidemiology Capacity

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Center of Excellence in Public Health Workforce Studies

- Funded by the CDC Office of Workforce and Career Development through a cooperative agreement with the Public Health Foundation
- Operational since September 2009
- Sister center to University of Kentucky Center of Excellence in Public Health Workforce Research and Policy led by Dr. Douglas Scutchfield

Current Projects

- Analyze data to characterize national epidemiology workforce in partnership with CSTE
  - Epidemiology Capacity Assessments
  - Epidemiology-Laboratory Capacity (ELC grant) Assessment
  - National assessment of food safety epidemiology capacity
  - Laboratory Capacity Assessment
- Comprehensive literature review emphasizing use of models in workforce capacity and forecasting need
  - Create online searchable database for workforce literature
- Pursue additional funding for workforce capacity studies
  - Kresge Foundation grant of $300K to assess MCH workforce in Detroit

Recent Research

Boulton, ML, Hadler J, Beck AJ, Ferland L, Lichtveld M (2010). Assessment of epidemiology capacity in state health departments, 2004-2009. *Public Health Reports* (accepted)

Boulton, ML. (2009). Toward a more analytic framework for public health workforce research. *J Public Health Manag Pract*, 15(6 Suppl), S62-S63 .

Centers for Disease Control and Prevention. (2009). Assessment of epidemiology capacity in state health departments—United States, 2009. *MMWR Morb Mortal Weekly Rep*., 58(49):1373–7.

Boulton, ML, Lemmings, J, & Beck, AJ. (2009). Assessment of epidemiology capacity in state health departments, 2001-2006. *J Public Health Manag Pract*, 15(4), 328-36.

Montgomery JP, Beck AJ, Rothney EE, Boulton ML. (2009). From survey to assessment: characterizing Michigan's public health workforce. *Disaster Medicine and Public Health Preparedness,* 3(3), S1-S8.

Lichtveld *M,* Boulton M, Lemmings J, Gale J. (2008) From Competencies to Capacity: Assessing the National Epidemiology Workforce. *Public Health Reports* 2008; 123 (2): Supplement 1: 128-135

In development

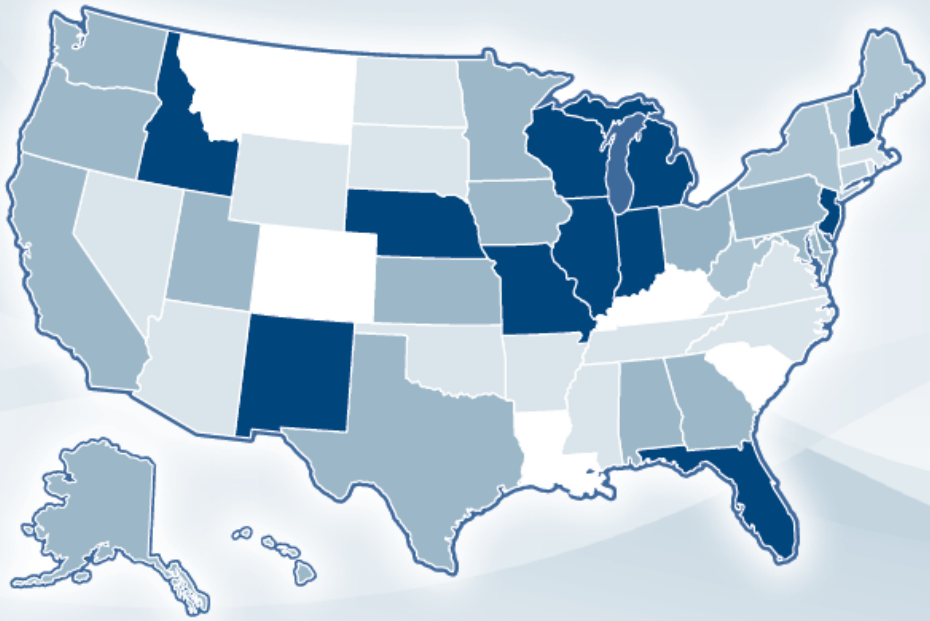
Beck AJ, Boulton ML, Ferland L. in RA, Hodge K, Robinson L. Recruitment and Retention of Epidemiologists, 2009. American Journal of Preventive Medicine

Boulton ML, Thacker S, Goodman R, Beck AJ. State Epidemiologist: History and Current Status, 2009. American Journal of Public Health.

COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS

2009 NATIONAL ASSESSMENT OF EPIDEMIOLOGY CAPACITY

Findings and Recommendations



CSTE

MSPH

University of Michigan School of Public Health

Center of Excellence in Public Health Workforce Studies

MSPH

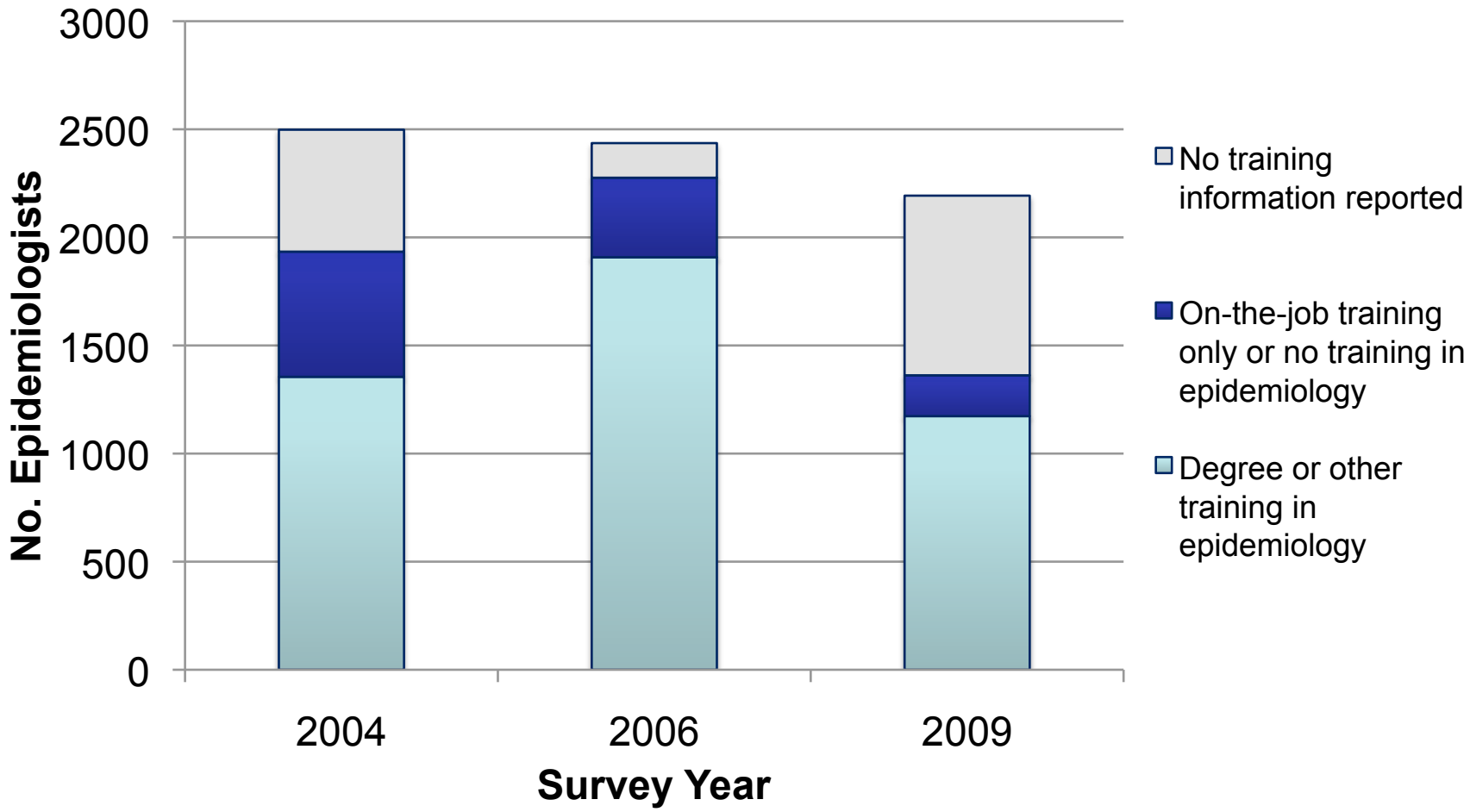
Center of Excellence in Public Health Workforce Studies

www.phworkforce.org

CSTE Epidemiology Capacity Assessment

- Four national assessments of epidemiology capacity in state health departments: 2001, 2004, 2006, & 2009
- Enumeration, training and educational background, and competency level of epidemiologists working in state health departments
- Assessment of program capacity: infectious disease, chronic disease, MCH, environmental health, emergency response, oral health, occupational health, and injury
- Functional capacity to carry out the four epi-related essential services of public health
- Technical/IT surveillance capacity

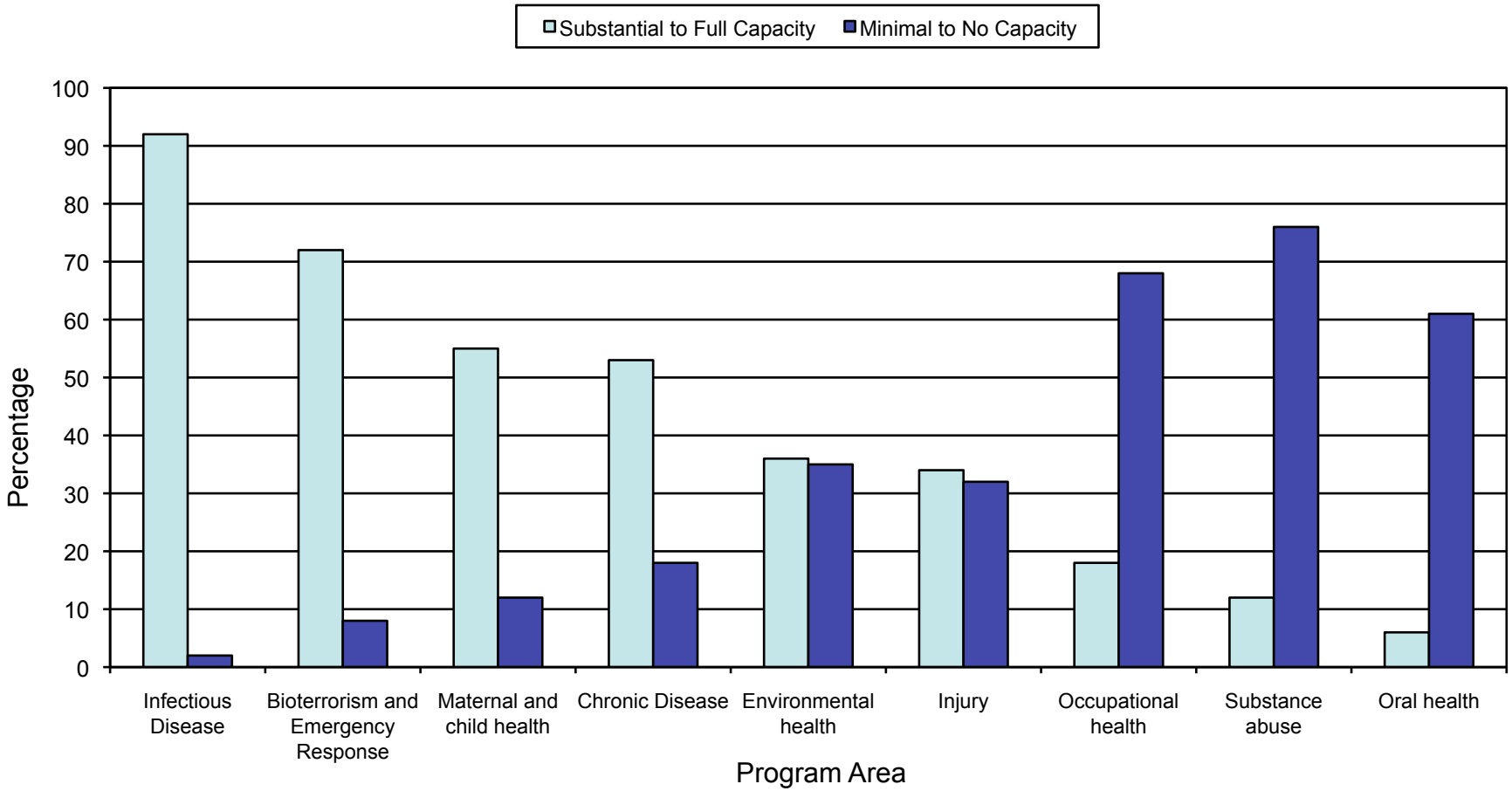
FIGURE 1. Number of state health department epidemiologists and level of training, by survey year- Epidemiology Capacity Assessments, 2004, 2006, 2009



Program Area Capacity

- Programs with substantial-to-full program capacity for most states:
  - Infectious disease (50% of all epidemiologists)
  - Emergency response/bioterrorism preparedness
  - Maternal/child health
  - Chronic diseases
- Programs with minimal-to-no program capacity for most states:
  - Occupational health
  - Substance abuse
  - Oral health
- Other programs
  - Environmental health
  - Injury

FIGURE 2. Percentage of 50 state health departments and DC reporting substantial-to-full and minimal-to-no capacity* in epidemiology and surveillance programs, by program area – United States, 2009

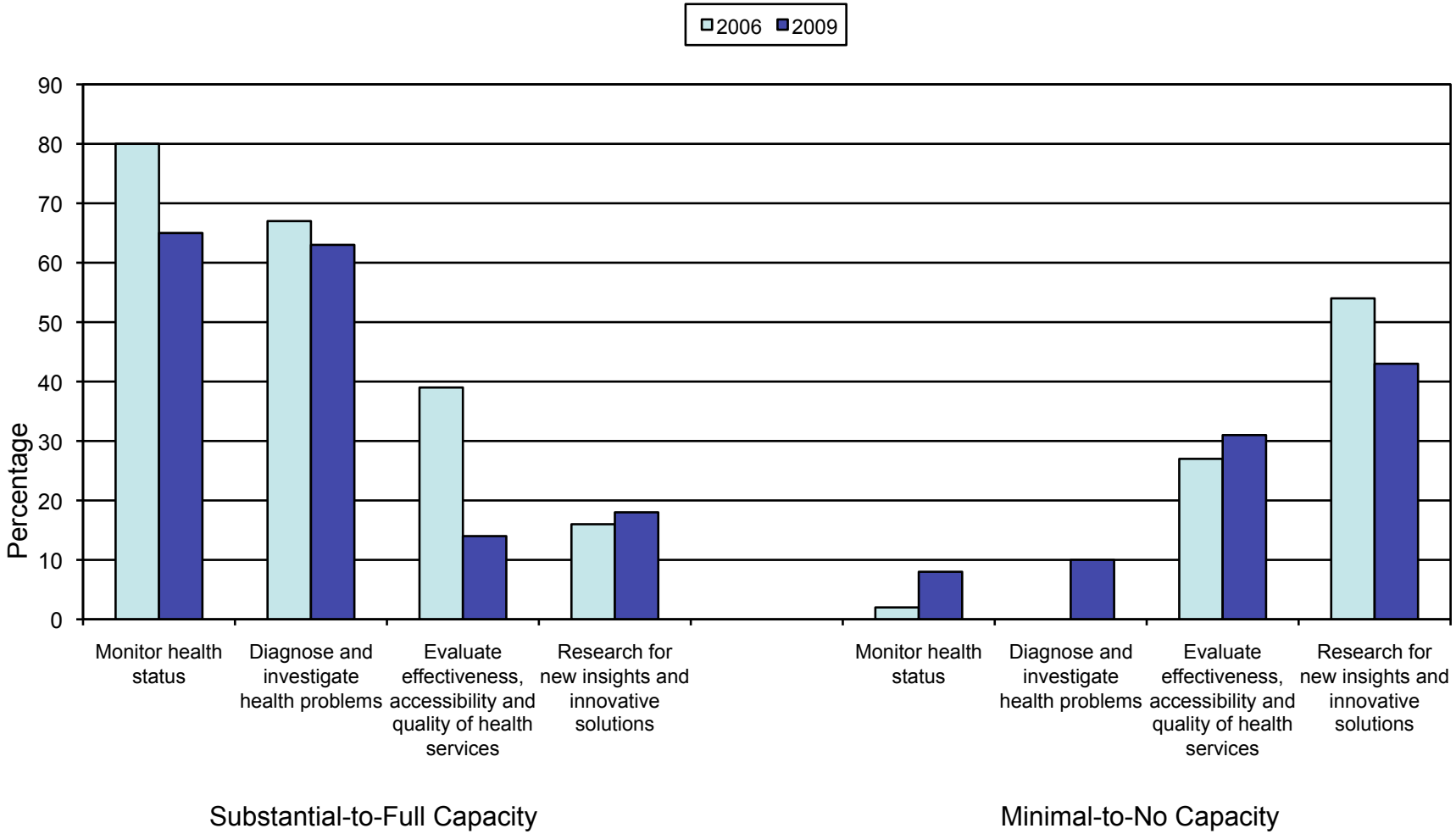


*Substantial-to-full – 50%-100%; Minimal-to-no = <25%

ESPH Capacity

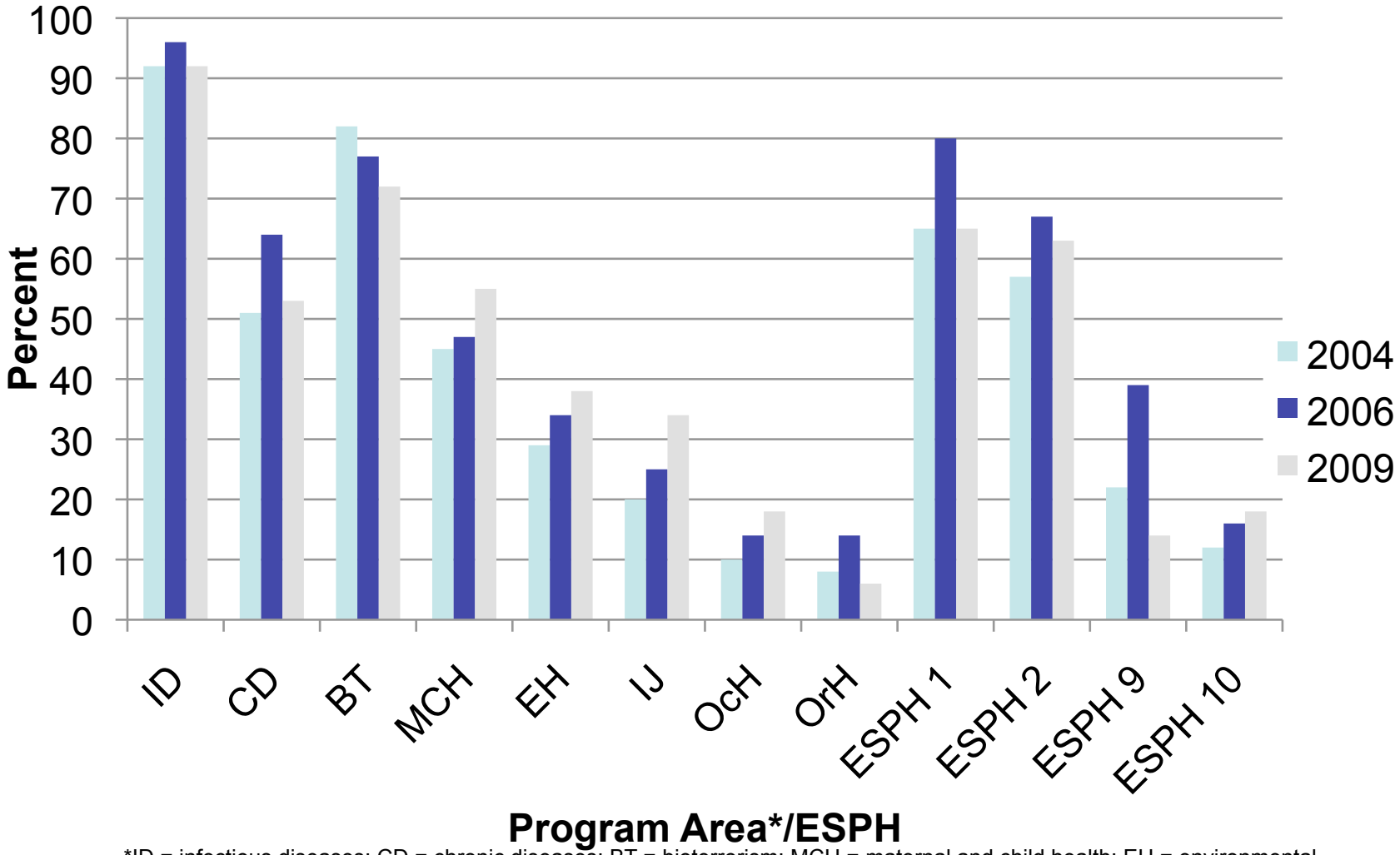
- Four epi-related ESPH: monitor, diagnose /investigate, evaluate, and research
- Capacity decreased from 2006 to 2009 for three of four Essential Services of Public Health
- Capacity increased for ESPH 10: Research for new insights and innovative solutions

FIGURE 3. Percentage of 50 state health departments and DC reporting substantial-to-full and minimal-to-no capacity* in four essential services of public health -– United States, 2006 and 2009



* Substantial-to-full : 50% to100%; Minimal-to-no : <25%

FIGURE 4. Percentage of state health departments reporting substantial-to-full epidemiology and surveillance capacity and capacity to conduct the four epidemiology-related Essential Services of Public Health (ESPH), by survey year—Epidemiology Capacity Assessment



*ID = infectious diseases; CD = chronic diseases; BT = bioterrorism; MCH = maternal and child health; EH = environmental health; IJ=injury; OcH = occupational health; OrH = oral health

Epidemiologists: Training & Education

- Most epidemiologists have a graduate degree
  - 54% MPH
  - 17% PhD or DrPH
  - 11% MD or DO
  - 4% DVM or DDS
  - 1% RN
  - 11% BS or BA
- More than half of epidemiologists (57%) have a degree specifically in epidemiology
- Approximately 14% of epidemiologists have had no coursework or formal training in epidemiology

TABLE 1. Level of education or training of epidemiologists working in state health departments and the District of Columbia by program area--Epidemiology Capacity Assessment, 2009

Level of training	ID	CD	BT	MCH	EH	IJ	OcH	SA	OrH	Other	Total no. (%)†
PhD, DrPH, or other doctoral degree in epidemiology	39 (5%)	21 (12%)	8 (6%)	25 (17%)	12 (10%)	1 (<1%)	3 (14%)	0 (0%)	0 (0%)	12 (9%)	121 (7%)
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology	95 (12%)	10 (5%)	21 (17%)	11 (7%)	6 (5%)	2 (8%)	1 (5%)	0 (0%)	1 (25%)	17 (12%)	164 (11%)
MPH, MSPH, other master's degree in epidemiology	317 (41%)	66 (37%)	46 (37%)	43 (30%)	46 (39%)	16 (41%)	10 (43%)	2 (33%)	1 (25%)	39 (27%)	586 (38%)
BA, BS, other bachelor's degree in epidemiology	8 (<1%)	1 (1%)	1 (<1%)	1 (<1%)	2 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	14 (1%)
Formal training program in epidemiology (e.g,, EIS)	56 (7%)	9 (5%)	14 (12%)	8 (6%)	6 (5%)	6 (15%)	1 (5%)	0 (0%)	0 (0%)	3 (2%)	103 (7%)
Some coursework in epidemiology	164 (14%)	43 (24%)	21 (17%)	36 (25%)	29 (25%)	8 (21%)	7 (32%)	1 (17%)	2 (50%)	38 (27%)	349 (22%)
On-the-job training in epidemiology	82 (21%)	24 (14%)	12 (10%)	18 (13%)	14 (12%)	5 (12%)	<1 (1%)	2 (33%)	1 (25%)	21 (15%)	177 (12%)
No formal training in epidemiology	9 (<1%)	3 (2%)	1 (1%)	3 (2%)	2 (2%)	1 (3%)	0 (0%)	1 (17%)	0 (0%)	10 (7%)	30 (2%)
Total by program	**770**	**177**	**124**	**144**	**117**	**39**	**22**	**6**	**4**	**141**	**1544**
All epidemiologists†	**50%**	**11%**	**8%**	**9%**	**8%**	**3%**	**2%**	**<1%**	**<1%**	**9%**	**100%**

*ID, infectious diseases; CD, chronic diseases; BT, bioterrorism; MCH, maternal and child health; EH, environmental health; IJ, injury; OcH, occupational health; SA, substance abuse; OrH, oral health.
†Percentages do not equal 100 because of rounding.

TABLE 1 ● Level of education or training of epidemiologists working in state health departments and the District of Columbia by program area and estimate of need, Epidemiology Capacity Assessment, 2006

	Bioterrorism	Chronic diseases	Environmental health	Infectious diseases	Injury	Maternal and child health	Occupational health	Oral health	Total of all epidemiologists
PhD, DrPH, or other doctoral degree in epidemiology	25 (8%)	55 (17%)	24 (8%)	45 (4%)	8 (8%)	28 (12%)	7 (14%)	1 (3%)	193 (8%)
Professional background (eg, MD, DO, DVM, DDS) with dual degree in epidemiology	36 (11%)	19 (6%)	7 (2%)	111 (11%)	2 (2%)	20 (8%)	1 (2%)	3 (10%)	199 (8%)
MPH, MSPH, or other master's degree in epidemiology	133 (40%)	119 (37%)	86 (30%)	380 (37%)	49 (51%)	72 (30%)	17 (33%)	8 (28%)	864 (36%)
BA, BS, or other bachelor's degree in epidemiology	8 (2%)	3 (1%)	2 (1%)	29 (3%)	3 (3%)	4 (2%)	2 (4%)	1 (3%)	52 (2%)
Formal training program in epidemiology (eg, EIS)	24 (7%)	5 (2%)	20 (7%)	93 (9%)	2 (2%)	11 (5%)	2 (4%)	0 (0%)	157 (7%)
Some coursework in epidemiology	54 (16%)	67 (21%)	50 (17%)	183 (18%)	17 (18%)	62 (26%)	5 (10%)	7 (24%)	445 (19%)
On the job training in epidemiology	40 (12%)	35 (11%)	61 (21%)	124 (12%)	11 (11%)	23 (10%)	4 (8%)	6 (21%)	304 (13%)
No formal training in epidemiology	6 (2%)	7 (2%)	7 (2%)	10 (1%)	3 (3%)	19 (8%)	13 (25%)	1 (3%)	66 (3%)
Training not reported	6 (2%)	14 (4%)	30 (10%)	42 (4%)	1 (1%)	2 (1%)	0 (0%)	2 (7%)	97 (4%)
Total by program (proportion of all epidemiologists)	332 (14%)	324 (14%)	287 (12%)	1017 (43%)	96 (4%)	241 (10%)	51 (2%)	29 (1%)	2377 (100%)[a]
Estimated need of epidemiologists for full capacity (percentage increase)	426 (28%)	457 (41%)	353 (23%)	1190 (17%)	185 (93%)	334 (39%)	139 (173%)	90 (210%)	3172 (30%)[b]

Percentages do not equal 100 due to rounding.
No program information reported for 59 of 2 436 epidemiologists.
[b]Increase over the total 2 436 epidemiologists reported.

Surveillance Capacity

- Nearly all states use or have plans to use a NEDSS-compliant disease database
- 27 states (53%) have fully functional ELR
- Nearly half of states use or have plans to use a formal web-based provider disease reporting system
- One quarter of states routinely use automated cluster-detection software

FIGURE 5. Percentage of states reporting laboratory and disease reporting technical capacity– 2009 Epidemiology Capacity Assessment

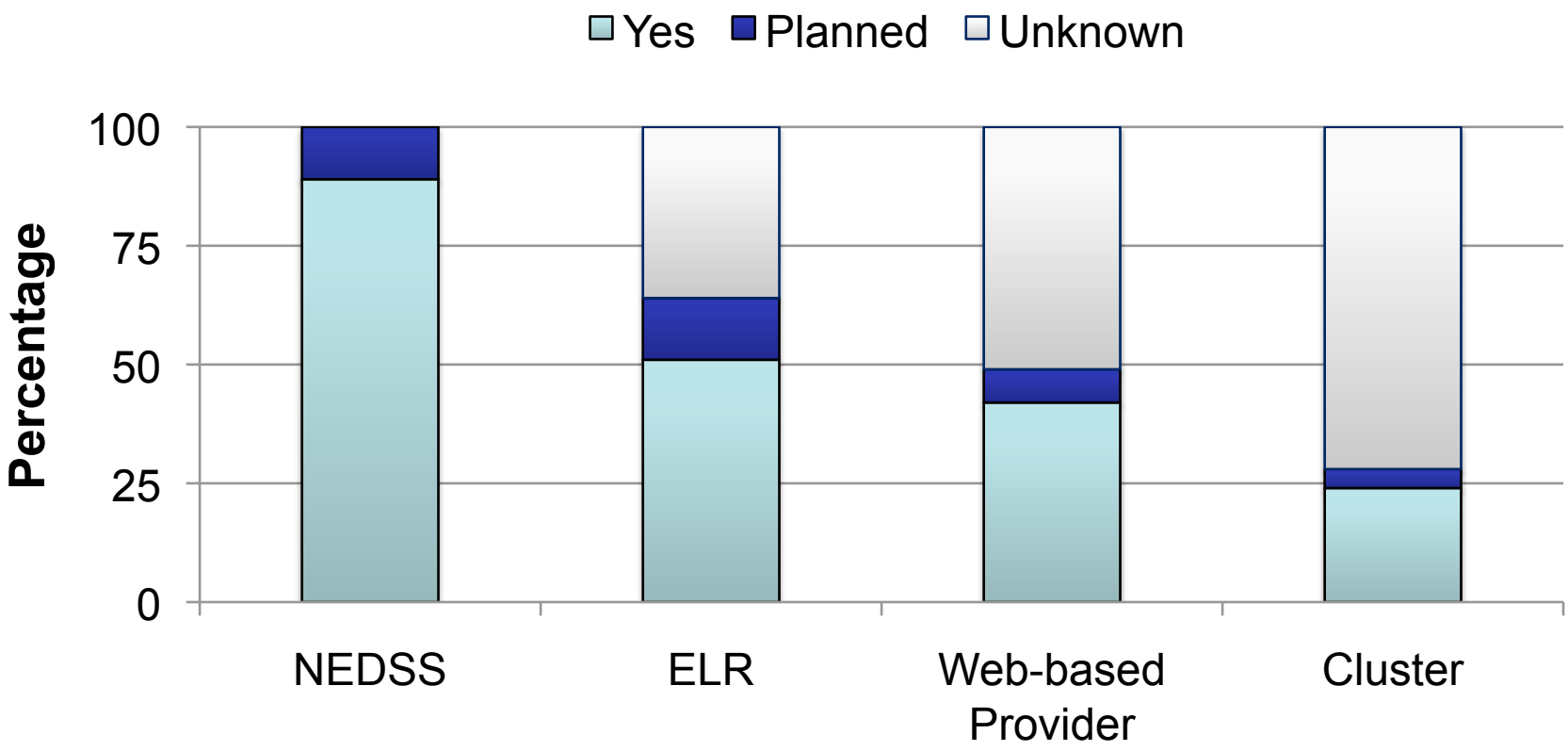
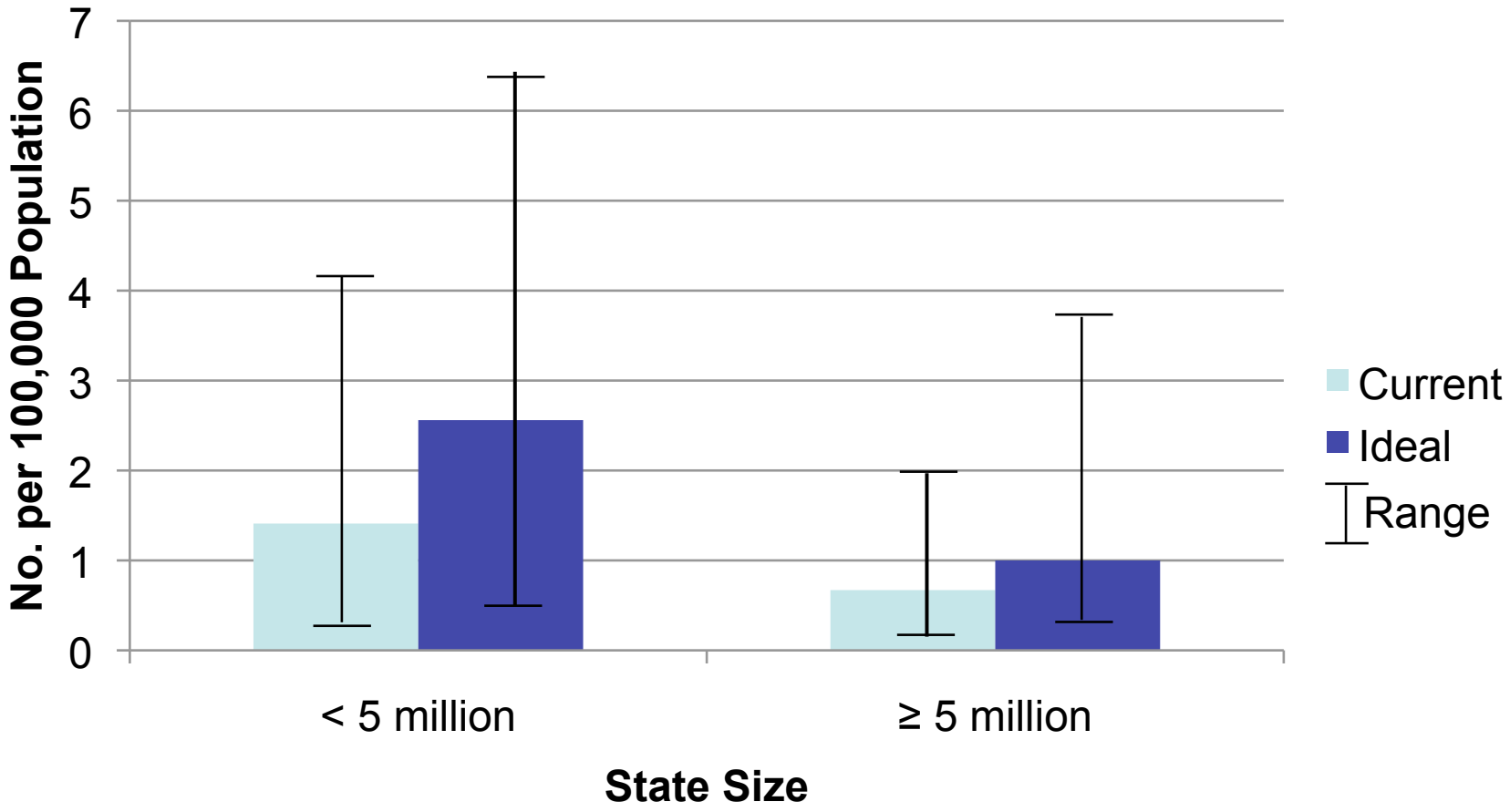


Table 2. Variables of interest and their relation with the total number of epidemiologists in a state—Epidemiology Capacity Assessment, 2006

Variable of Interest (Statistical Test)		*P* Value*
Population (simple linear regression)		<.0001*
Structure within state health department† (Tukey's test)		
	Difference in Means‡	
Unit vs. Program	26.6	.0107*
ESPH capacity (Tukey's test)		
(High vs. low capacity)§	Difference in Means	
ESPH 2	10.1	.4316
ESPH 10	10.3	.7866
ESPH 1	19.3	.1169
ESPH 9	N/A	
Program capacity (Tukey's test)		
(High vs. low capacity)§	Difference in Means	
Chronic diseases	0.8	.9523
Bioterrorism	3.5	.7474
Infectious diseases	8.2	.4471
Maternal and child health	13.7	.4021
Environmental health	27	.1646
Injury	32.2	.0961
Occupational health	33.3	.2204
Oral health	36.3	.3372

* Significant ($P < .05$).
† Unit = state health departments where epidemiologists are located together in one organizational unit. Program = state health departments where epidemiologists are located within specific programs.
‡ Difference in the average number of total epidemiologists stratified by the variable of interest.
§ Low capacity = none to partial capacity; high capacity = substantial to full capacity.

FIGURE 3. Mean current and optimal number of epidemiologists, by state size- 2009 Epidemiology Capacity Assessment



2009 ECA Summary Findings

- A smaller, but better-trained, epidemiologist workforce was reported in 2009
- Overall number of epidemiologists has continued to decrease since 2004
- Epidemiology capacity to provide Essential Services of Public Health has decreased
- Program capacity in BT/emergency response is falling and remains low in environmental and occupational health, oral health, injury, and substance abuse
- Most state health departments lack adequate IT/technical capacity for modern disease threats

National Epidemiology Capacity

- Program specific assessments, like food safety, are an important adjunct to larger-scale, periodic capacity assessments like the ECA
- Combination of surveys provides more complete picture of epidemiology capacity although survey coordination key issue
- Future needs
  - Better data on laboratory capacity
  - Developing useable metrics for capacity
  - Competency assessment in program areas
  - Assessing unmet need